UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,257	01/05/2007	Marie-Therese Perrot-Simonetta	295085US0PCT	7546

22850 7590 05/15/2009

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
COHEN, STEFANIE J	

ART UNIT	PAPER NUMBER
1793	

NOTIFICATION DATE	DELIVERY MODE
05/15/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/593,257	PERROT-SIMONETTA ET AL.	
	Examiner	Art Unit	
	STEFANIE COHEN	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-16 are rejected under 35 U.S.C. 102(b) as being unpatentable by Watari et al (5922145).

Watari, cols. 2 and 3, teaches a non-heat-treated type steel product which has the following chemical composition based on % by weights C: 0.2% to 0.6%; Si: 0.05% to 1.5%; Mn: 0.01% to 2.0%; P: 0.07% or less; S: 0.01% to 0.2%; Al: 0.002% to 0.05%; Cu: 0% to 1.0%; Ni: 0% to 2.0%; Cr: 0% to 2.0%; Mo: 0% to 0.5%; V: 0% to 0.3%; Nb: 0% to 0.1%; and the balance: Fe and unavoidable impurities, wherein at least 90% of the microstructure of the steel is constituted by ferrite and pearlite.

Further, Watari teaches in non-heat-treated type steel products, having a certain chemical composition and containing at least 90% of ferrite and pearlite in the microstructure; an excellent balance between strength and toughness can be obtained, if ferrite accounts for 20% to 70% based on area percentage.

Watari, cols. 14 and 15, teaches in order to make not less than 90% of the microstructure of a non-heat-treated type steel product to be constituted by ferrite and pearlite, a semi-finished product may first be heated to 1050-1300oC., then subjected to

hot working such as hot forging to finish at a temperature not lower than 900oC., and subsequently subjected to air cooling or atmospheric cooling at a cooling rate of not more than 60o C./min for at least a period until the temperature reaches 500oC. In the present specifications the expression "cooling rate" refers to the cooling rate as measured on the surface of the steel product.

Further, Watari, col. 15 lines 60-63, teaches when aging treatment is performed by the application of heat under conditions of 200-700.degree. C. for 20-150 minutes following hot working and cooling, a particularly excellent balance between strength and toughness can be obtained.

Further, the method taught by Watari is the same method as disclosed in the specification therefore it would be expected that the Watari steel would have the same properties and therefore the ferrite would be acicular ferrite.

Further, Watari, col. 15 lines 45-60, teaches when the prior austenite grain size in the microstructure is 4 or more as expressed by the JIS grain size number, a non-heat-treated type steel product in which not less than 90% of the microstructure is constituted by bainite or a combination of ferrite and bainite (i.e., a "steel product under Condition Y") can be consistently imparted with well-balanced strength and toughness. As used herein, the expression "prior austenite grains" in a non-heat-treated type steel product refers to austenite grains right before bainite or ferrite is generated therefrom as a result of transformation under heat and hot working. Prior austenite grains in a non-heat-treated type steel product in which not less than 90% of the microstructure is constituted

by bainite or a combination of ferrite and bainite can be readily determined through corrosion with nital and observation under an optical microscope.

Regarding claims 2 and 5, Watari, cols. 2 and 3, teaches a non-heat-treated type steel product which comprises Al in the amount ranging from 0.002% to 0.05% by weight.

Regarding claims 3 and 6, Watari, col. 7 lines 21-30, teaches Ca, if added, has an effect of remarkably improving machinability of steel. To reliably obtain this effect, the calcium content shall be, desirably not less than 0.001%. However, when the calcium content is in excess of 0.01%, not only the above-mentioned effect saturates, but also fatigue strength and/or toughness decrease as coarse inclusions are produced. Therefore, the calcium content shall be from 0% to 0.01%.

Regarding claim 7, Watari, col. 21 lines 15-30, teaches each of the steels was hot forged, such that the steel was heated to a temperature of 1250oC and then finished at a temperature of 1000oC, to obtain a round bar having a diameter of 60 mm. The hot-forged round bars were cooled to a temperature of 300oC, at a cooling rate of 5oC/min to 35oC/min by air cooling or atmospheric cooling, thereby adjusting their microstructures, so as to obtain a tensile strength of about 845 MPa to 870 MPa. For steels 6, 7, 9, 11, 29 to 36, 40, 45 and 46, the hot-forged round bars were cooled as above and then heated at a temperature of 770oC. to 900oC. for 1 hour, followed by

water quenching. The water-quenched round bars were tempered at a temperature of 550oC. to 560oC. (followed by air cooling), so as to adjust their microstructures and strengths.

Regarding claims 8 and 9, Watari teaches the hot-forged round bars were cooled to a temperature of 300.degree. C., at a cooling rate of 5 oC./min to 35oC./min (.083 oC/s to .58oC/s) by air cooling or atmospheric cooling.

Regarding claims 11-13, Watari, cols. 2 and 3, teaches a non-heat-treated type steel product which comprises Si in the amount ranging from 0.05% to 1.5% by weight.

Regarding claims 14-16, Watari teaches in non-heat-treated type steel products, having a certain chemical composition and containing at least 90% of ferrite and pearlite in the microstructure; an excellent balance between strength and toughness can be obtained, if ferrite accounts for 20% to 70% based on area percentage.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watari et al (5922145) as applied to claim 1.

It would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the heating and cooling conditions to obtain a specific amount of acicular ferrite in the final composition.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watari et al (5922145) as applied to claim 4.

It would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the heating and cooling conditions to obtain a specific amount of acicular ferrite in the final composition.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Watari et al (5922145) as applied to claim 10.

It would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the heating and cooling conditions to obtain a specific amount of acicular ferrite in the final composition.

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Watari et al (5922145).

The admitted prior art teaches the manufacturing process of medium or small size mechanical parts of medium carbon micro alloyed steel usually can comprise an operation of cold (press or forge) or hot (forge) plastic deformation, the choice of the hot or cold method often being made according to the final size of the parts. In all cases, this operation will be performed on pieces of steel cut up into bars deriving from long, continuously cast hot-rolled siderurgical semiproducts. When the plastic deformation is performed "hot," the pieces of steel are reheated beforehand to a temperature of approximately 1000 to 1200oC., then hot-formed in the forge. The parts obtained then are cooled and treated thermally by hardening and tempering.

Although the admitted prior art teaches a process for manufacturing mechanical part, the admitted prior art does not disclose a specific composition of the steel or a metallographic structure containing acicular ferrite.

Watari, cols. 2 and 3, teaches a non-heat-treated type steel product which has the following chemical composition based on % by weights C: 0.2% to 0.6%; Si: 0.05% to 1.5%; Mn: 0.01% to 2.0%; P: 0.07% or less; S: 0.01% to 0.2%; Al: 0.002% to 0.05%; Cu: 0% to 1.0%; Ni: 0% to 2.0%; Cr: 0% to 2.0%; Mo: 0% to 0.5%; V: 0% to 0.3%; Nb: 0% to 0.1%; and the balance: Fe and unavoidable impurities, wherein at least 90% of the microstructure of the steel is constituted by ferrite and pearlite.

Further, Watari teaches in non-heat-treated type steel products, having a certain chemical composition and containing at least 90% of ferrite and pearlite in the

microstructure; an excellent balance between strength and toughness can be obtained, if ferrite accounts for 20% to 70% based on area percentage.

Further, Watari, col. 15 lines 45-60, teaches when the prior austenite grain size in the microstructure is 4 or more as expressed by the JIS grain size number, a non-heat-treated type steel product in which not less than 90% of the microstructure is constituted by bainite or a combination of ferrite and bainite (i.e., a "steel product under Condition Y") can be consistently imparted with well-balanced strength and toughness. As used herein, the expression "prior austenite grains" in a non-heat-treated type steel product refers to austenite grains right before bainite or ferrite is generated therefrom as a result of transformation under heat and hot working. Prior austenite grains in a non-heat-treated type steel product in which not less than 90% of the microstructure is constituted by bainite or a combination of ferrite and bainite can be readily determined through corrosion with nital and observation under an optical microscope.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the Watari composition with the admitted prior art method because Watari teaches these steel products which have excellent machinability and thus are suitable for steel stocks of structural steel parts for a variety of machinery such as transportation machinery including automobiles, machinery for industrial use, construction machinery, and the like, and to provide a variety of machined structural steel parts for machinery, such as crankshafts, connecting rods, gears, and the like.

Regarding claims 2 and 5, Watari, cols. 2 and 3, teaches a non-heat-treated type steel product which comprises Al in the amount ranging from 0.002% to 0.05% by weight.

Regarding claims 3 and 6, Watari, col. 7 lines 21-30, teaches Ca, if added, has an effect of remarkably improving machinability of steel. To reliably obtain this effect, the calcium content shall be, desirably not less than 0.001%. However, when the calcium content is in excess of 0.01%, not only the above-mentioned effect saturates, but also fatigue strength and/or toughness decrease as coarse inclusions are produced. Therefore, the calcium content shall be from 0% to 0.01%.

Regarding claim 7, the admitted prior art teaches the manufacturing process of medium or small size mechanical parts of medium carbon micro alloyed steel usually can comprise an operation of cold (press or forge) or hot (forge) plastic deformation, the choice of the hot or cold method often being made according to the final size of the parts. In all cases, this operation will be performed on pieces of steel cut up into bars deriving from long, continuously cast hot-rolled siderurgical semiproducts. When the plastic deformation is performed "hot," the pieces of steel are reheated beforehand to a temperature of approximately 1000 to 1200oC., then hot-formed in the forge. The parts obtained then are cooled and treated thermally by hardening and tempering.

Regarding claims 8 and 9, Watari teaches the hot-forged round bars were cooled to a temperature of 300.degree. C., at a cooling rate of 5 oC./min to 35oC./min (.083 oC/s to .58oC/s) by air cooling or atmospheric cooling.

Regarding claims 11-13, Watari, cols. 2 and 3, teaches a non-heat-treated type steel product which comprises Si in the amount ranging from 0.05% to 1.5% by weight.

Regarding claims 14-16, Watari teaches in non-heat-treated type steel products, having a certain chemical composition and containing at least 90% of ferrite and pearlite in the microstructure; an excellent balance between strength and toughness can be obtained, if ferrite accounts for 20% to 70% based on area percentage.

Regarding claims 17-19, it would have been obvious to one of ordinary skill in the art at the time of the invention to optimize the heating and cooling conditions to obtain a specific amount of acicular ferrite in the final composition.

Response to Arguments

Applicant's argument, filed 2/2/2009, with respect to the rejection(s) of claim(s) 1-10 under Nishioka and admitted art over Nishioka have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Watari and admitted art in view of Watari.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEFANIE COHEN whose telephone number is (571)270-5836. The examiner can normally be reached on Monday through Thursday 9:3am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Melvin Curtis Mayes can be reached on 5712721234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stefanie Cohen 4/29/2009

SC
May 9, 2009

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1793